

Bridge 4900  
Spanning the Root River on Trunk Highway 16  
Rushford  
Fillmore County  
Minnesota

HAER No. MN-55

HAER  
MINN  
23-RUSH,  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Rocky Mountain Regional Office  
U. S. Department of the Interior  
P.O. Box 25287  
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# HISTORIC AMERICAN ENGINEERING RECORD

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23-RUSH  
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## Bridge 4900

HAER No. MN-55

**Location:** Spanning Root River on Trunk Highway 16  
Rushford, Fillmore County, Minnesota

UTM: A 15/600400/4850320  
B 15/600400/4850300  
Quad: Rushford West

**Date of Construction:** 1930 (modified in 1957 and 1967)

**Designer:** Minnesota Highway Department

**Builder:** Minneapolis Bridge Company

**Present Owner:** Minneapolis Department of Transportation  
Transportation Building  
St. Paul, Minnesota

**Present Use:** Vehicular and pedestrian bridge to be replaced by a new vehicular and pedestrian bridge. Projected date of removal is summer 1992.

**Significance:** Bridge 4900 is a three-span, rivet-connected Parker through truss. It is one of the largest bridges built according to plans developed by the Minnesota Highway Department during the early years of Minnesota's trunk highway construction program.

**Project Statement:** Bridge 4900 will be replaced because of structural deterioration, deficient roadway width, and inadequate waterway opening under the structure. The Historic American Engineering Record documentation is being prepared in fulfillment of a stipulation of the Memorandum of Agreement between the Federal Highway Administration and the Minnesota State Historic Preservation Office and accepted by the Advisory Council on Historic Preservation on May 10, 1991.

**Historian:** Patrick Nunnally  
Minnesota Historical Society

May 1992

## **I. THE BRIDGE**

### **A. Description**

Bridge 4900 is a three-span Parker through truss steel bridge built in 1930. The middle span is 162' 2", and the two outer spans stretch 160' 1". The bridge, as a whole, measures 482' 4" from the face of the north abutment to the face of the south abutment. It carries a 24-foot roadway and has a 5' 3" sidewalk on the upstream side of the bridge.

The bridge was constructed according to the standard plans developed by the Minnesota Highway Department for 160' span Parker through trusses. The diagonal members and top chords are constructed of steel channel beams joined by batten plates. The bridge's vertical members consist of angle beams joined by lacing. The floor beams and stringers are I-beams.

The bridge piers are cast-in-place solid column concrete piers. The abutments are cast-in-place concrete. Both piers and abutments were built according to Minnesota Highway Department standard plans.

The superstructure connections are riveted, which provides the rigidity necessary for long spans carrying heavy traffic. According to a turn-of-the-century textbook on bridge engineering, rivet connections have been used from the earliest days of iron and steel bridges. As shop facilities improved, rivet connections became preferred to pin connections. By 1905, then, the authors could say ". . . at the present time the consensus of engineering opinion gives it (rivet connection) the preference over all types of [bridge] structures ranging from 125 to about 200 feet. (Burr and Falk, p. 22)

### **B. Modifications**

In 1957, Bridge 4900 was remodeled to accommodate taller truck traffic. All six portals were raised and 10 sway frames were revised to add stability to the taller structure.

In 1967, in response to increased flooding on the Root River, the entire structure was raised seven feet, the piers were modified and new abutments were constructed. In order to raise the bridge, Minnesota Highway Department engineers jacked the superstructure up at each pier and abutment, using temporary piers. The work proceeded slowly because adjacent roadway had to be regraded at intervals, so that traffic could continue to use the bridge while it was being modified. Once the bridge had been raised enough to satisfy the waterway opening requirements, a grillage of I-beams with anchor bolts was constructed between the piers and the superstructure. Concrete was then poured around the grillage to create new piers and abutments. The jacking was then removed, allowing the superstructure to settle onto the newly-constructed supports.

### **C. Ownership and Future**

Bridge 4900 has been owned by the state of Minnesota since it was built in 1930. Originally, the Minnesota Highway Department (now officially known as the Minnesota Department of

Transportation (MnDOT), the state agency responsible for highway transportation) has maintained the bridge since it was built.

An analysis, conducted by MnDOT in 1991, determined that Bridge 4900 was deficient for modern traffic needs. The bridge deck roadway width of 22.8 feet from curb to curb is substantially less than the 40-foot approach roadway. The bridge deck has about 22 percent unsound areas, and random areas on all three spans needed shoring up. The bridge currently has a poor capacity rating, which means that more than one truck cannot use the bridge at the same time.

Three alternatives to the replacement of Bridge 4900 have been considered. Rehabilitation is neither prudent nor feasible because the narrow roadway cannot be widened enough on a through truss structure to meet modern roadway width standards. Relocation of the route, which would avoid the bridge, is not practical because there are no reasonable alternate locations that would serve the towns now served by the highway.

The deteriorated condition of the bridge makes the "do nothing" alternative incompatible with providing a safe and efficient transportation system.

## II. HISTORY

### A. Local Historical Context

Bridge 4900 is not the first bridge to span the Root River at Rushford. Since the 1870s, a steel high truss bridge had crossed the river approximately 1/4 mile west of Bridge 4900. It was narrow and light, and, like many nineteenth century steel bridges, was not sufficient to carry the growing truck and automobile traffic of the 1910s and 1920s.

When the Minnesota Highway Department began developing the trunk highway network in the Rushford area, it was decided that a new roadway alignment would meet modern engineering standards better than an alignment that included the old bridge. Hence, the decision to build Bridge 4900 in its particular location rather than slightly up or down stream.

Whatever the location, the citizens of Rushford appear not to have taken much notice of their new bridge. The local newspaper carried updates on the construction, but there does not appear to have been any sort of celebration to mark the opening of the bridge. Perhaps a reason for this can be determined from the fact that Bridge 4900 did not provide dramatic transportation improvements between Rushford and the surrounding region. Even before the bridge was opened, there was substantial commercial traffic among the regional towns, if advertisements in the Tri-County Record can be taken as evidence. It is certainly true that the bridge, and the paved roadway that accompanied it, improved access between Rushford and the surrounding area, particularly during the spring, but the improvement was incremental rather than dramatic.

## B. Construction Chronology

The Tri-County Record, published in Rushford, provides a chronology of the progress on the construction of Bridge 4900. On October 10, 1929, the paper announced that bids on the construction of the bridge would open on October 29. Shortly thereafter, on November 7, it was announced that the Minneapolis Bridge Company had been awarded the contract to build the bridge for \$59,000. As planned, the bridge would be 480 feet in length.

Once construction started, the paper made periodic updates of construction progress. Steel for the job, fabricated by the American Bridge Company, was received the first week in January 1930, and the work was reported to be near completion on March 13, 1930. All that remained to be done at that date was to lay the floor, which was being delayed by cold weather. The May 1, 1930, edition of the paper reported by the concrete floor on one span had been laid and that workmen were building the forms for the floor on the other two spans. It was anticipated that the floor would be finished within the following two weeks.

## C. Minnesota Highway Department Bridge Program

When the Minnesota Highway department (MHD) was established in 1920, the construction of bridges was one of its top priorities. For years, the department's predecessor, the Minnesota Highway Commission, had grappled with the problem of substandard, unsafe bridges across the state. The Minnesota Highway Commission (1905-1919) was authorized to draw up standardized bridge plans and require their use on projects cost more than \$500. The commission never engaged in contract letting or bridge building in its own right; those responsibilities were left up to the counties and municipal governments.

Bridge construction undertaken by the MHD was part of an overall program of road construction termed the "trunk highway" network. The goal was to provide safe, year-round road transportation that connected the state's major population centers and its regional agricultural marketing centers. The Tri-County Record in Rushford noted that the bridge project that built Bridge 4900 would close the last gap in the trunk highway system between Rushford and the neighboring town of Lanesboro (Tri-County Record, October 10, 1929).

The MHD bridge construction program did not get fully underway until 1923, when the Report to the Legislature records that around 100 projects were built. Later in the decade, during the time Bridge 4900 was built, the program was fully operational. The 1929-1930 Report to the Legislature notes that "Highway Department expenditures for bridge work during 1929 and 1930 exceeded similar outlays for like purposes during any previous biennium since the establishment of the Trunk Highway System" (Report to the Legislature, p. 10).

At the same time the MHD was developing a bridge construction program, traffic on Minnesota's roads was increasing dramatically. The reports to the legislature during the 1920s contain traffic surveys that document the increased number of cars and trucks on the highways. The growing truck traffic, and the faster speeds at which all traffic was moving, had direct implications for

the bridge construction program. Bridges needed to be heavier and stronger to carry current traffic loads. This meant that Parker truss bridges, with polygonal top chords which put the top chord members in compression, became the high truss span of choice in the 1920s. Parker truss bridges carry heavier loads across longer spans than conventional Pratt or Warren trusses.

There were limits to what MHD engineers attempted within the confines of their own plans. Large highway bridges across the Mississippi and Minnesota rivers were contracted out to professional bridge engineers who brought their particular expertise to bear on these large span crossings. It is significant to note that Bridge 4900 is one of the largest and most complicated bridges built according to MHD standard plans during the first decade of the trunk highway program. As such, it represents the upper threshold of the work of this important program.

#### D. The Minneapolis Bridge Company

The Minneapolis Bridge Company was formed in 1888. After several subsequent reorganizations, it was incorporated in 1916. During this entire period, the company built bridges across the state of Minnesota. Between 1908 and 1944, the Minneapolis Bridge Company is known to have built at least 31 bridges in Minnesota (Frame, pp. 87-88).

#### E. The American Bridge Company

The American Bridge Company was formed in 1900. In 1901, its founder, J. P. Morgan and Company, brought it under the control of the United States Steel Corporation. Twenty-four companies, representing half of the nation's steel fabricating capacity, were acquired by the American Bridge Company within a year of its organization. The precise extent of American Bridge Company activities in Minnesota is difficult to determine, but the presence of American Bridge Company steel in the construction of Bridge 4900 is a measure of the project's magnitude (Darnell, pp. 85-86; Frame, pp. 65-66).

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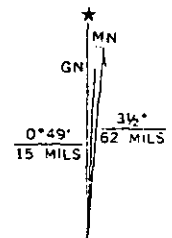
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UTM GRID AND 1974 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

